CLAIMS

1. A composition for forming porous film comprising:

an acid or base generator for generating acid or base by its thermal decomposition and

a polymer which is obtainable by hydrolyzing and condensing one or more silane compounds represented by Formula (1):

$$(R^1)_aSi(R^2)_{4-a} \qquad (1)$$

wherein R^1 represents a straight chain or branched monovalent hydrocarbon having 6 to 20 carbons which may be substituted or unsubstituted and when there are R^1s, the R^1s each may be independently same or different; R^2 represents a hydrolysable group and when there are R^2s, the R^2s each may be independently same or different; and a is an integer of 1 to 3.

2. A composition for forming porous film comprising:

an acid or base generator for generating acid or base by its thermal decomposition and

a polymer which is obtainable by hydrolyzing and co-condensing one or more silane compounds represented by Formula (1) and one more silane compounds represented by Formula (2), Formulas (1) and (2) being:

$$(R^1)_aSi(R^2)_{4-a} \qquad (1)$$

$$(R^3)_bSi(R^4)_{4-b} \qquad (2)$$

wherein R^1 represents a straight chain or branched monovalent hydrocarbon having 6 to 20 carbons which may be substituted or unsubstituted and when there are R^1s, the R^1s each may be independently same or different; R^2 represents a hydrolysable group and when there are R^2s, the R^2s each may be independently same or different; and a is an integer of 1 to 3; R^3 represents a straight chain or branched monovalent hydrocarbon having 1 to 5 carbons which may be substituted or unsubstituted and when there are R^3s, the R^3s each may be independently same or different; R^4 represents a hydrolysable group and when there are R^4s, the R^4s each may be independently same or different; and b is an integer of 0 to 3.

3. The composition for forming porous film according to Claim 2 wherein said polymer is a silanol group-containing hydrolysate having number-average molecular weight of 100 or more, and in said polymer 30 to 80 mol% of structural units derived from said silane compound represented by Formula (2) is represented by Formula (3):

$$Si(OH)_c(R^5)_{4-c} \qquad (3)$$

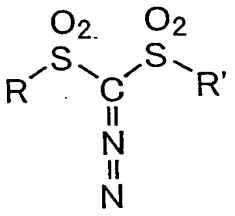
wherein R^5 represents a siloxane residue or R^3, and c is an integer of 1 or 2.

4. The composition for forming porous film according any one of Claims 1 to 3 wherein decomposition temperature of said acid or base generator is lower than decomposition

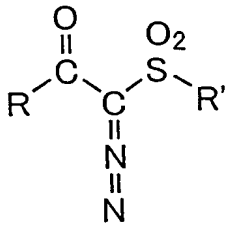
temperature of R^1 of said polymer.

5. The composition for forming porous film according to Claim 4 wherein said acid or base generator has decomposition temperature of 250°C or less.

6. The composition for forming porous film according to Claim 5 wherein said acid or base generator is a diazo compound represented by Formula (4) or (5):



(4)



(5)

wherein R and R′ each independently represents an alkyl group, an aromatic group, an aralkyl group or a fluoroalkyl group and R and R′ may be same or different.

7. A method for forming porous film comprising a step of applying said composition of any one of Claims 1 to 6 on a substrate to form a film and a step of transforming the film into porous film.

8. The method for forming porous film according to Claim 7 wherein said step of transforming comprises a step of drying the film and a step of forming pores in the dried film.

9. The method for forming porous film according to Claim 7 or 8 wherein said step of transforming comprises the

thermal treatment of 170 to 400°C.

10. A porous film obtainable from said composition according to any one of Claims 1 to 6.

11. An interlevel insulator film formable by said composition according to any one of Claims 1 to 6.

12. A semiconductor device comprising an internal porous film formed by a composition comprising an acid or base generator for generating acid or base by its thermal decomposition and a polymer obtainable from one or more silane compounds.

13. The semiconductor device according to Claim 12 wherein said polymer is obtainable by hydrolyzing and condensing one or more silane compounds represented by Formula (1):

$$(R^1)_aSi(R^2)_{4-a} \qquad (1)$$

wherein R^1 represents a straight chain or branched monovalent hydrocarbon having 6 to 20 carbons which may be substituted or unsubstituted and when there are R^1s, the R^1s each may be independently same or different; R^2 represents a hydrolysable group and when there are R^2s, the R^2s each may be independently same or different; and a is an integer of 1 to 3.

14. The semiconductor device according to Claim 12 wherein said polymer is obtainable by hydrolyzing and co-condensing one or more silane compounds represented by

Formula (1) and one more silane compounds represented by Formula (2), Formulas (1) and (2) being:

$$(R^1)_aSi(R^2)_{4-a} \qquad (1)$$

$$(R^3)_bSi(R^4)_{4-b} \qquad (2)$$

wherein R^1 represents a straight chain or branched monovalent hydrocarbon having 6 to 20 carbons which may be substituted or unsubstituted and when there are R^1s, the R^1s each may be independently same or different; R^2 represents a hydrolysable group and when there are R^2s, the R^2s each may be independently same or different; and a is an integer of 1 to 3; R^3 represents a straight chain or branched monovalent hydrocarbon having 1 to 5 carbons which may be substituted or unsubstituted and when there are R^3s, the R^3s each may be independently same or different; R^4 represents a hydrolysable group and when there are R^4s, the R^4s each may be independently same or different; and b is an integer of 0 to 3.

15. The semiconductor device according to Claim 14 wherein said polymer is a silanol group-containing hydrolysate having number-average molecular weight of 100 or more, and in said polymer 30 to 80 mol% of structural units derived from said silane compound represented by Formula (2) is represented by Formula (3):

$$Si(OH)_c(R^5)_{4-c} \qquad (3)$$

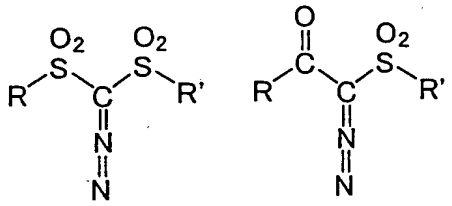
wherein R^5 represents a siloxane residue or R^3, and c is an

integer of 1 or 2.

16. The semiconductor device according to any one of Claims 13 to 15 wherein decomposition temperature of said acid or base generator is lower than decomposition temperature of R^1 of said polymer.

17. The semiconductor device according to Claim 16 wherein said acid or base generator has decomposition temperature of 250°C or less.

18. The semiconductor device according to Claim 17 wherein said acid or base generator is a diazo compound represented by Formula (4) or (5):



(4) (5)

wherein R and R′ each independently represents an alkyl group, an aromatic group, an aralkyl group or a fluoroalkyl group and R and R′ may be same or different.

19. The semiconductor device according to any one of Claims 12 to 18 wherein said porous film is between metal interconnections in a same layer of multi-level interconnects, or is between upper and lower metal interconnection layers.